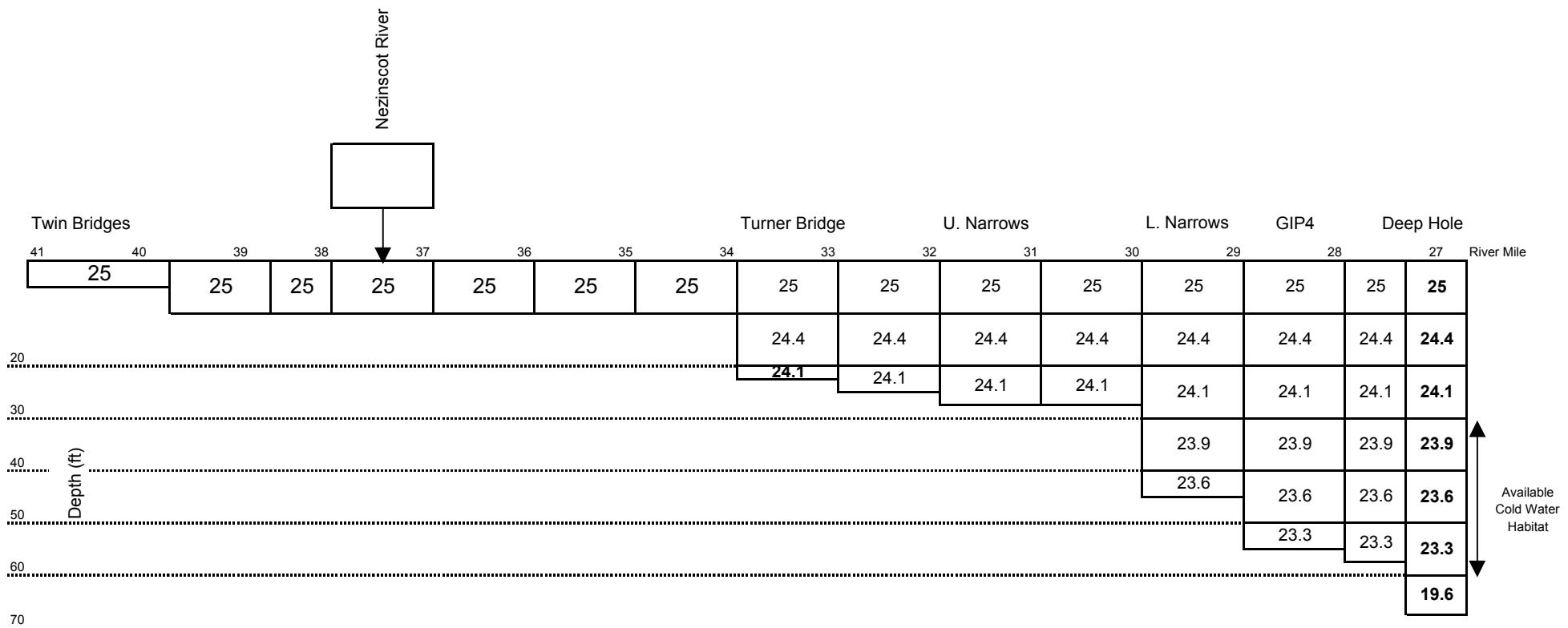
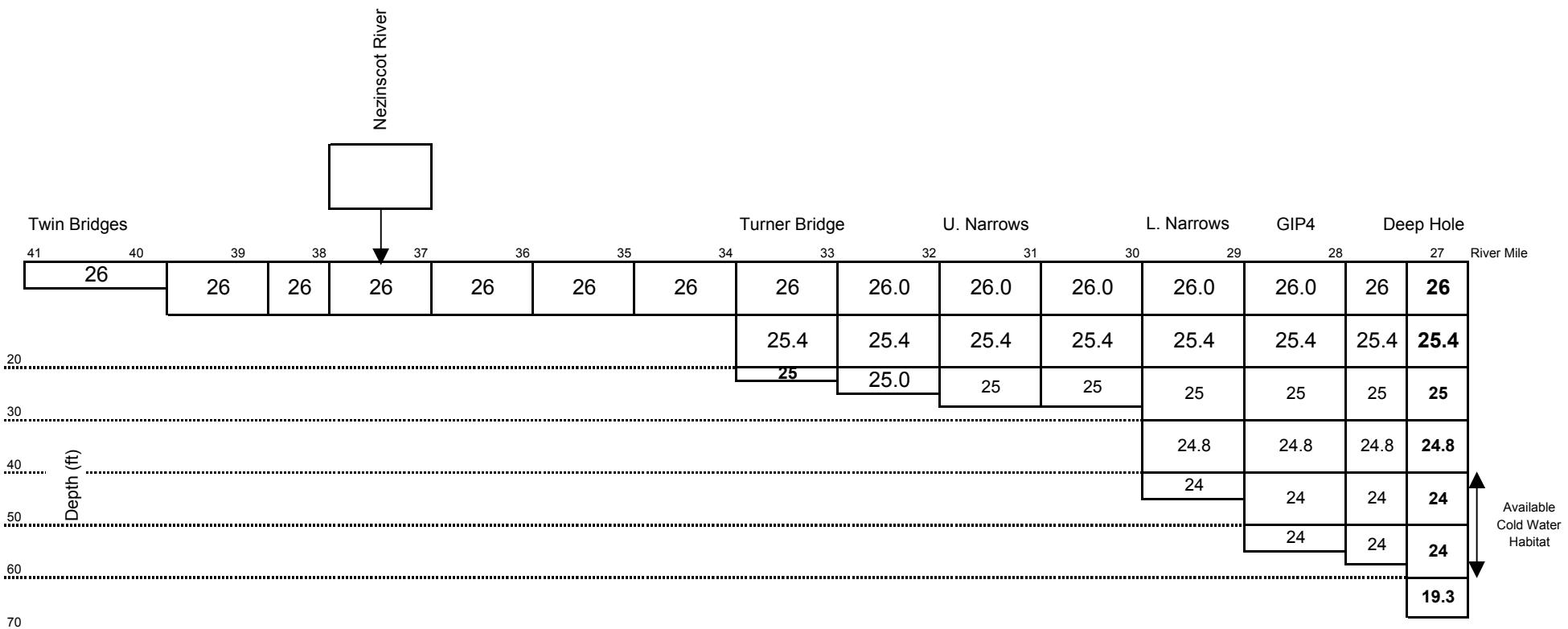


Temperature at 30Q10



Temperature at 7Q10



TMDL Summary

Oxygen Injection Requirements

Option	Turner Bridge	Upper Narrows (current location)	Lower Narrows
#1	65,000		95,000
#2	60,000	150,000	

License Requirements Point Source Loads - Summer Limits apply May - Sept

Point Source	Summer BOD5 Mo. Ave. PPD	Summer BOD5 Weekly Ave. PPD	Annual Mo. Ave TSS PPD	Summer Mo. Ave. TP PPD
Fraser	11000	14700	20000	109
Mead	9000	12800	15500	119
IP	8000	8100	25000 / 8000*	177
Berlin**	660	990	660	13
Rumford-Mexico**	663	994	663	11
Livermore Falls**	500	750	500	6
Paper Mill Cluster .34 Fras + .67 Mead + IP	12000			

Point Source - Allocation for Small Discharges

Point Source	Mo Ave BOD5 PPD	Weekly Ave BOD5 PPD	Monthly Ave TSS PPD	Summer Mo AveTP PPD
Gorham	188	281	188	16
Bethel	75	113	75	5
Rumford Point	5	7	5	0.1
North Jay	15	23	15	1

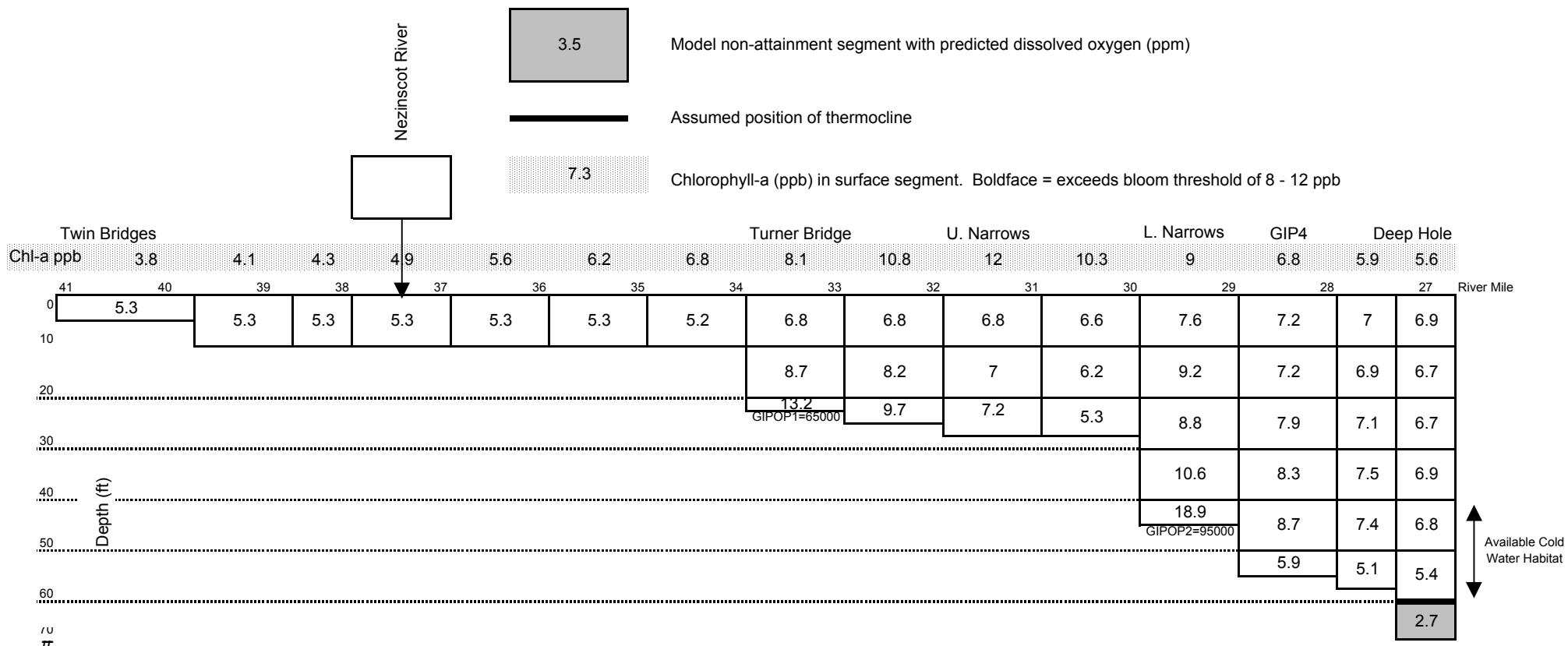
	Mo Ave BOD5 PPD***	Weekly Ave BOD5 PPD***	Monthly Ave TSS PPD	Summer Mo AveTP PPD
Non-point + Natural	1306	1241	35595	67
Total	31411	39998	98201	524

*IP - A summer TSS limit of 8000 ppd is needed for aquatic life non-attainment outside of Gulf Island Pond.

** For the municipal discharges, BOD5 and TSS are BPT that are applied annually.

***River UBOD converted to BOD5 by factor of 0.18 which is consistent with river assigned BOD decay rate of 0.04.

TMDL Option #1 - Model Prediction of Minimum Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run Att17Q10- Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 160000 ppd
Municipal BOD/TSS @ License

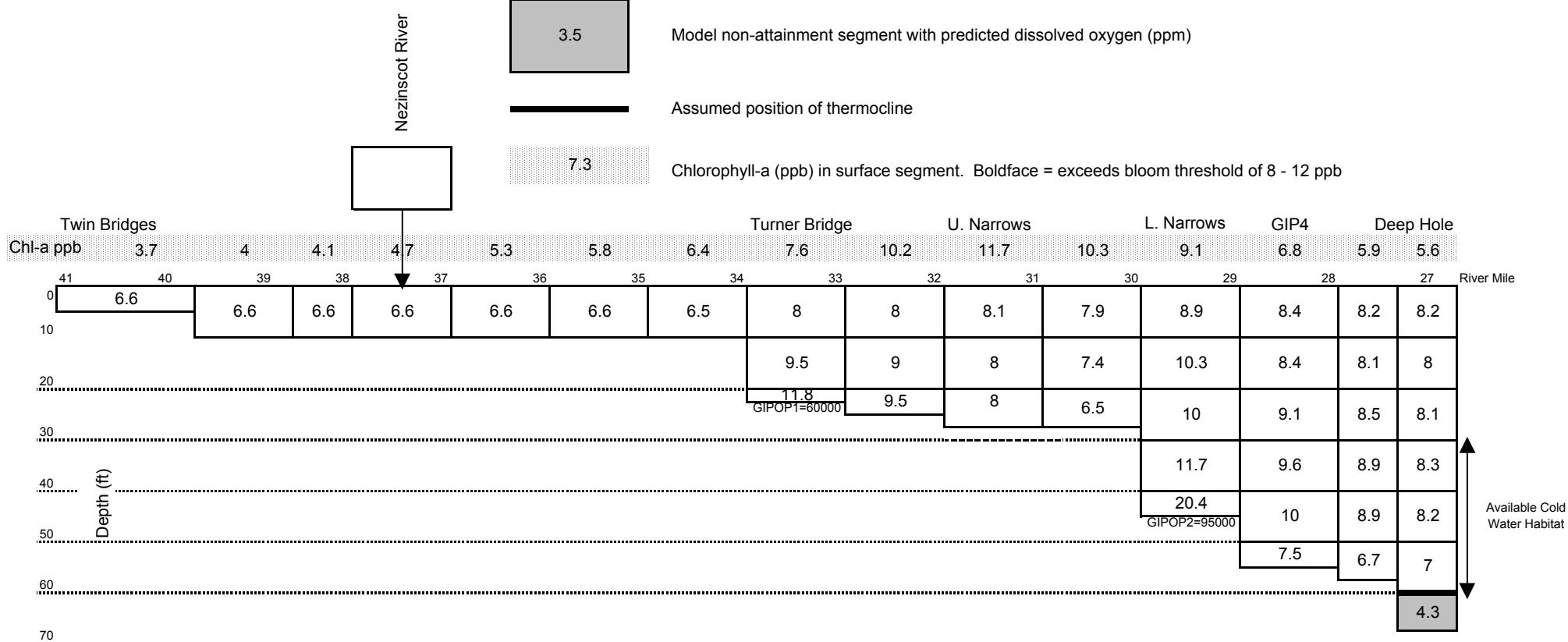


99% of the modeled volume of Gulf Island Pond meets minimum Class C dissolved oxygen criteria.

100% of available cold water habitat meet minimum class C dissolved oxygen criteria

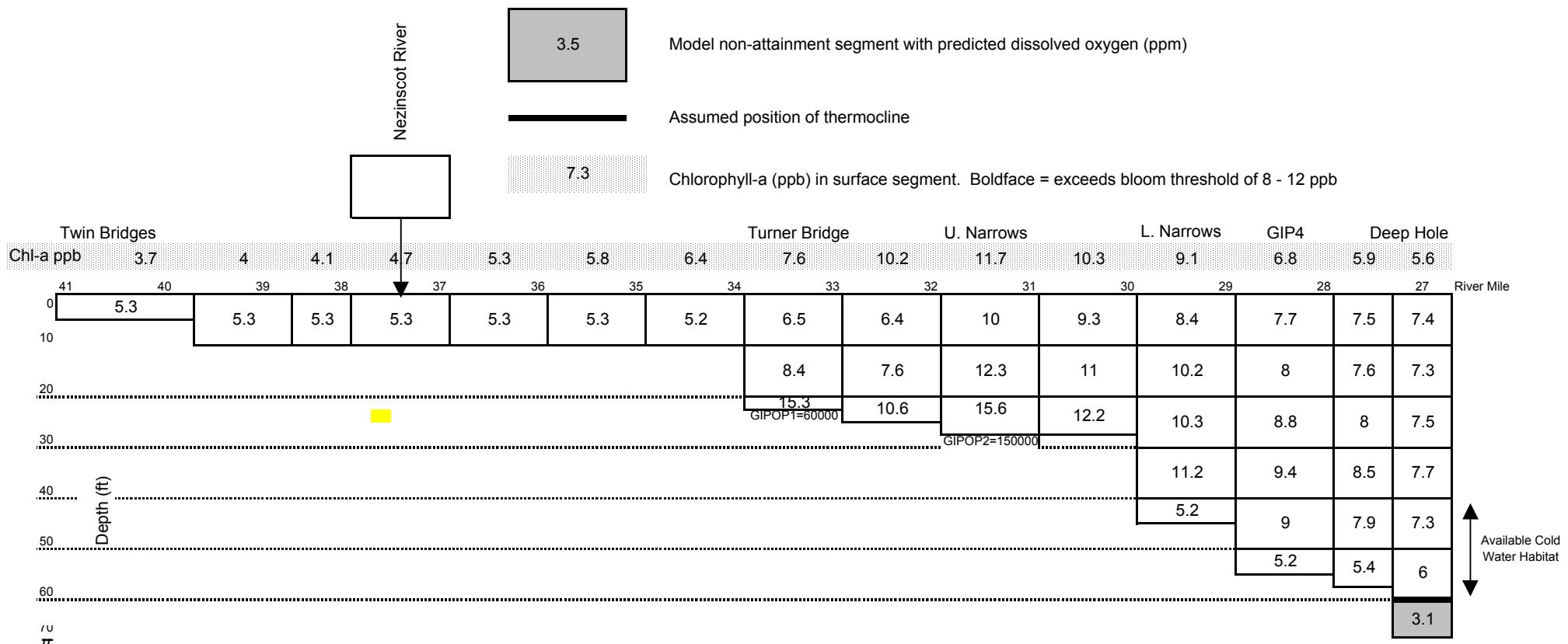
TMDL Option #1- Model Prediction of 30-Day Average Dissolved Oxygen Non-Attainment in Gulf Island Pond
 Run Att130Q - Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 155000 ppd

Collective Mill Monthly Average BOD limited to cluster of 12,000 ppd (.34 x Fraser + .67 x Mead + IP < 12,000)



99% of the modeled volume of Gulf Island Pond meets the monthly mean Class C dissolved oxygen criteria.
 100% of available cold water habitat meets 30-day average class C dissolved oxygen criteria

TMDL Option #2 - Model Prediction of Minimum Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run Att27Q10- Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 210000 ppd
Municipal BOD/TSS @ License

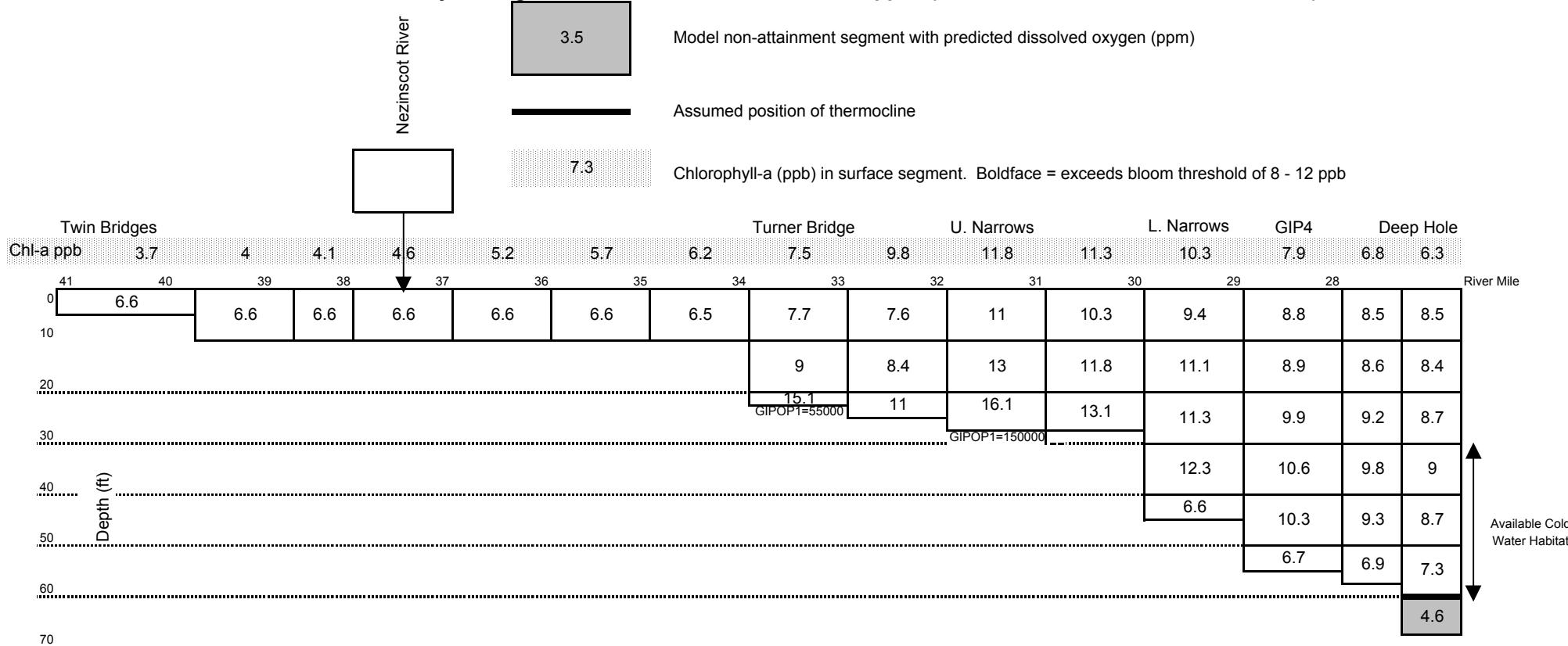


99% of the modeled volume of Gulf Island Pond meets minimum Class C dissolved oxygen criteria.

100% of available cold water habitat meet minimum class C dissolved oxygen criteria

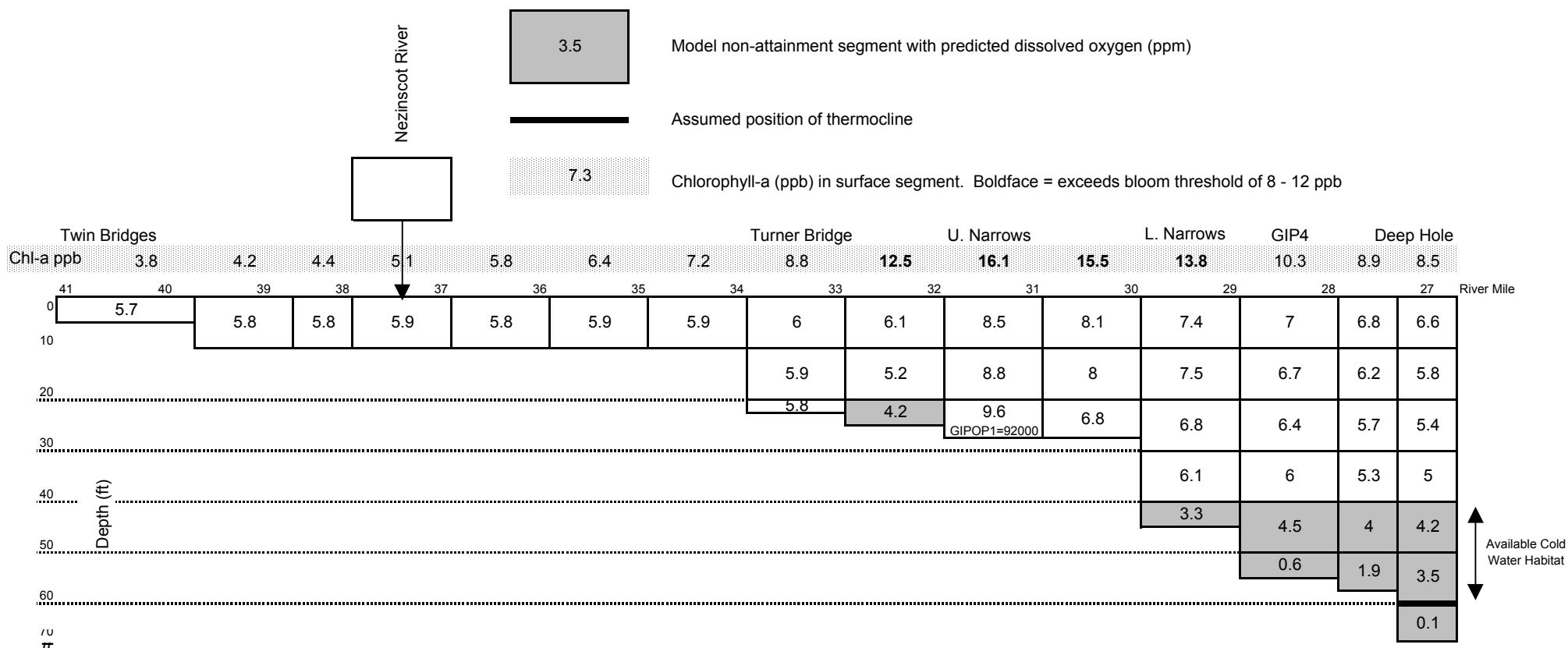
TMDL Option #2- Model Prediction of 30-Day Average Dissolved Oxygen Non-Attainment in Gulf Island Pond
 Run Att230Q - Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 205000 ppd

Collective Mill Monthly Average BOD limited to cluster of 12,000 ppd (.34 x Fraser + .67 x Mead + IP < 12,000)



99% of the modeled volume of Gulf Island Pond meets the monthly mean Class C dissolved oxygen criteria.
 100% of available cold water habitat meets 30-day average class C dissolved oxygen criteria

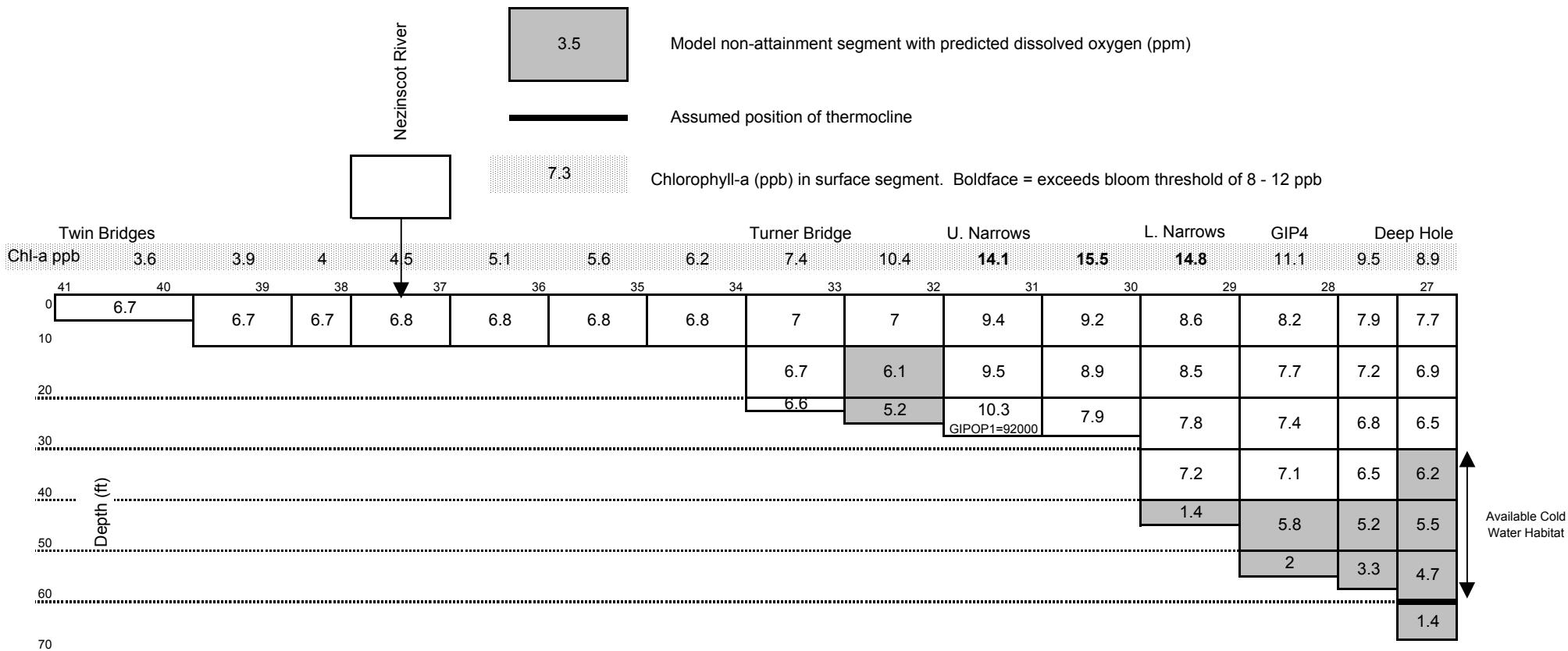
Matrix A - Model Prediction of Minimum Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run A7Q10 - Point Sources at Actual Discharge Levels (95%CI) with GIPOP @ 92000 PPD



89% of the modeled volume of Gulf Island Pond meets minimum Class C dissolved oxygen criteria.

0% of available cold water habitat meet minimum class C dissolved oxygen criteria

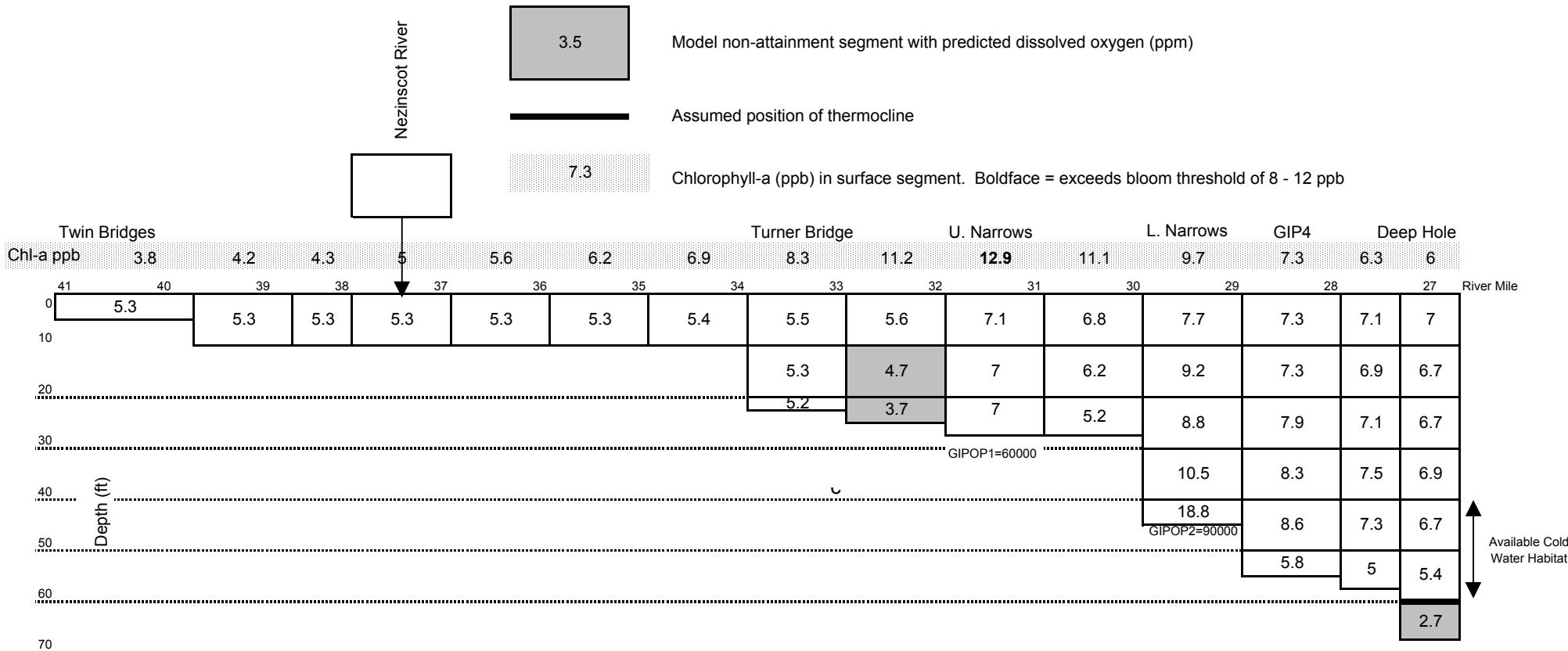
Matrix #A - Model Prediction of 30-Day Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run A30Q10 - Point Sources at Actual Discharge Levels (95% CI) with GIPOP @ 92000 ppd



85% of the modeled volume of Gulf Island Pond meets monthly average Class C dissolved oxygen criteria.

31% of available cold water habitat meets 30-day average class C dissolved oxygen criteria

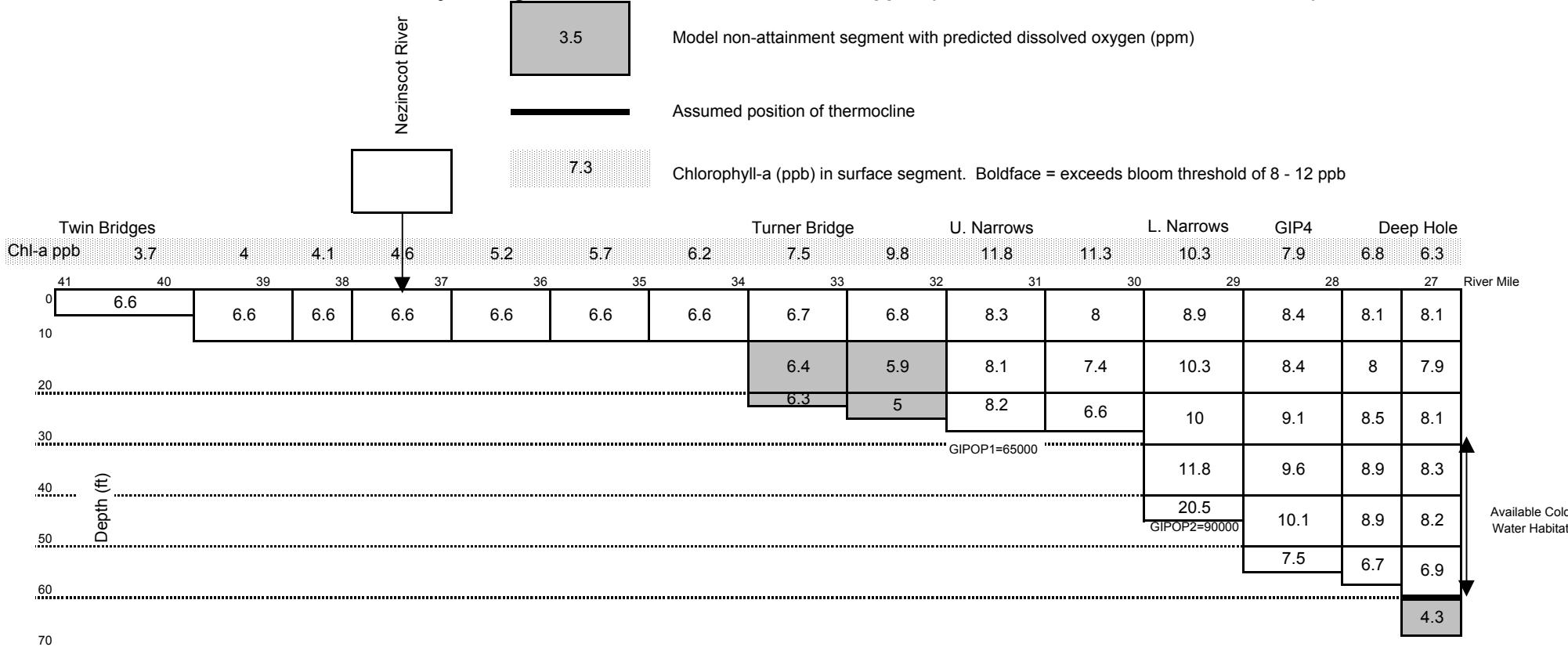
Matrix #F - Model Prediction of Minimum Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run F7Q10 - Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 150000 ppd
Municipal BOD/TSS @ License



97% of the modeled volume of Gulf Island Pond meets minimum Class C dissolved oxygen criteria.
 100% of available cold water habitat meet minimum class C dissolved oxygen criteria

Matrix #F- Model Prediction of 30-Day Average Dissolved Oxygen Non-Attainment in Gulf Island Pond
Run F30Q10 - Mill BOD at 77% of License; Mill TSS at 68% of License & TP Entering the Pond at 2/3 Current Levels with GIPOP @ 155000 ppd

Collective Mill Monthly Average BOD limited to cluster of 12,000 ppd (.34 x Fraser + .67 x Mead + IP < 12,000)



96% of the modeled volume of Gulf Island Pond meets the monthly mean Class C dissolved oxygen criteria.
 100% of available cold water habitat meets 30-day average class C dissolved oxygen criteria

Point Source Load Inputs For Model Prediction Runs

Actual Discharge Conditions

	BOD5 Mo Ave (ppd)	BOD5 Week Ave (ppd)	TSS Mo Ave (ppd)	TP Mo Ave (ppd)	Comment
Fraser	10200	16200	8200	148	
Mead	6300	9450	6100	220	Paper Mill BOD5 95% CI of summer 1998 - 2000 DMR's. TSS is an annual average.
IP	4300	5250	16000	268	
Berlin	200	300	337	60	
Gorham	60	90	107	16	Municipal BOD5 is a summer average of 1998 - 2000 DMR's. TSS is an annual average. TP loads based upon best available information for actual measured values.
Bethel	7	10	9	5	
Rum-Mex	155	250	160	30	
Liv. Falls	88	129	84	12	
Paper Mill	20800	30900	30300	636	
Municipal	510	779	697	123	
Total	21310	31679	30997	759	

Actual Discharge BOD5 / TSS for mills defined by 95% CI of log normal distribution of 1998 to 2000 as reported on DMR's. For municipal discharges it represent average discharge conditions for 1998- 2000 as reported on DMR's.

4-15-03 Model Runs

	BOD5 Mo Ave (ppd)	BOD5 Week Ave (ppd)	TSS Mo Ave (ppd)	TP Mo Ave (ppd)	Comment
Fraser	11000	14700	20000	118	Paper Mill BOD5 is summer limit. TSS is a monthly average limit applied all year. TP is a summer limit based upon 0.5 ppm concentration and actual flow.
Mead	9000	12800	15500	129	
IP*	8000	8100	19600	192	
Berlin	660	990	660	13.2	Municipal BOD5 / TSS are based upon BPT (30 / 45 ppm for mo ave / weekly ave) and licensed flow. TP loads based upon actual flow. TP concentration for Berlin, Rumford-Mexico, and Livermore Falls = 1 ppm and for Gorham and Bethel = actual.
Gorham	188	281	188	16.1	
Bethel	75	113	75	5.4	
Rum-Mex	663	994	663	10.8	
Liv. Falls	500	750	500	5.5	
Paper Mill	28000	35600	55100	439	Non-point source and natural pollution account for about 87 ppd TP. Hence even though point source TP is reduced 38%, the load into the pond is only reduced 33%
Municipal	2086	3128	2086	51	
Total	30086	38728	57186	490	

* IP TSS limit = 12000 ppd for May- Sept and 25,000 ppd for Oct-April. Weighted annual limit= 19,600 ppd.

TMDL Model Runs

	BOD5 Mo Ave (ppd)	BOD5 Week Ave (ppd)	TSS Mo Ave (ppd)	TP Mo Ave (ppd)	Comment
Fraser	11000	14700	20000	109	Paper Mill BOD5 is summer limit. TSS is a monthly average limit applied all year. TP is a summer limit based upon 0.5 ppm concentration and actual flow.
Mead	9000	12800	15500	119	
IP*	8000	8100	17900*	177	
Berlin	660	990	660	13.2	Municipal BOD5 / TSS are based upon BPT (30 / 45 ppm for mo ave / weekly ave) and licensed flow. TP loads based upon actual flow. TP concentration for Berlin, Rumford-Mexico, and Livermore Falls = 1 ppm and for Gorham and Bethel = actual.
Gorham	188	281	188	16.1	
Bethel	75	113	75	5.4	
Rum-Mex	663	994	663	10.8	
Liv. Falls	500	750	500	5.5	
Paper Mill	28000	35600	35500	405	Non-point source and natural pollution account for about 87 ppd TP. Hence even though point source TP is reduced 40%, the load into the pond is only reduced 36%
Municipal	2086	3128	2086	51	
Total	30086	38728	37586	456	

* IP TSS limit = 8000 ppd for May- Sept and 25,000 ppd for Oct-April. Weighted annual limit= 17,900 ppd.

Summary of Matrix Point Source Loads and O2 Injection

Matrix Option	Point Source	BOD5 Mo Ave (ppd)	BOD5 Week Ave (ppd)	TSS Mo Ave (ppd)	TP Mo Ave (ppd)	GIPOP 1 O2 (ppd)	GIPOP2 O2 (ppd)
A	Fraser	10200	16200	8200	148	92000	0
	Mead	6300	9450	6100	220		
	IP	4300	5250	16000	268		
	Munis	510	779	697	123		
B	Fraser	10200	16200	8200	148	60000	90000
	Mead	6300	9450	6100	220		
	IP	4300	5250	16000	268		
	Munis	510	779	697	123		
C	Fraser	10200	16200	8200	133	92000	0
	Mead	6300	9450	6100	175		
	IP	4300	5250	16000	230		
	Munis	510	779	697	123		
D	Fraser	10200	16200	8200	118	92000	0
	Mead	6300	9450	6100	129		
	IP	4300	5250	16000	192		
	Munis	510	779	697	51		
E	Fraser	11000	14700	20000	118	92000	0
	Mead	9000	12800	15500	129		
	IP	8000	8100	19600	192		
	Munis	510	779	697	51		
F	Fraser	11000	14700	20000	118	75000	90000
	Mead	9000	12800	15500	129		
	IP	8000	8100	19600	192		
	Munis	510	779	697	51		
G	Fraser	10200	16200	8200	76	92000	0
	Mead	6300	9450	6100	84		
	IP	4300	5250	16000	125		
	Munis	510	779	697	51		
H	Fraser	10200	16200	8200	59	92000	0
	Mead	6300	9450	6100	64		
	IP	4300	5250	16000	96		
	Munis	510	779	697	51		
I	Fraser	10200	16200	8200	118	45000	90000
	Mead	6300	9450	6100	129		
	IP	4300	5250	16000	192		
	Munis	510	779	697	51		
J	Fraser	10200	16200	8200	59	35000	70000
	Mead	6300	9450	6100	64		
	IP	4300	5250	16000	96		
	Munis	510	779	697	51		